

## PATENT SPECIFICATION

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## DRAWINGS ATTACHED

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## (54) APPLICATOR FOR PASTE-LIKE OR SEMI-LIQUID PRODUCTS

(71) I, FERNAND, ALBERT, JOSEPH, AUBRY, a French Citizen, of Avenue Sainte-Claire à 92, La Jonchère, Rueil-Malmaison, France, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to an applicator for applying a paste-like or semi-liquid product by means of a brush which is immersed in a container for the product, the applicator being particularly suited for use with cosmetic products, for instance mascara.

It has already been proposed to form applicators for such use in two parts: a cylindrical container, and a cap screwed on to this container. A crush-stem is formed integrally with said cap by moulding.

In applicators of this kind a seal is effected along a plane at right-angles to the axis of the container, the sealing faces being located at the base of the screw-threaded portion at the end of the cap and on a shoulder formed on said container. Thus, a seal is not achieved if the cap becomes slightly unscrewed or if it has not been screwed on sufficiently tightly.

This defect is the more serious since there is no other seal between the interior and the exterior of the container; only a draining lip is provided at the mouth of the container. Not only is this lip ineffectual as a stopper but there is always the possibility that the brush bristles will carry some of the product beyond this lip, and consequently there is nothing to prevent the product from leaking from the container if the cap is screwed on incorrectly or not tightly enough.

Efforts have been made to remedy this situation by providing a second sealing means, which either is disposed in a second plane also at right-angles to the container, or, as in U.S. Patent No. 3,280,421, involves the co-operation of two complementary tapered portions whose lateral faces are in contact

with each other when the cap is screwed on to the fullest extent.

Both of these solutions have proved ineffectual in practice.

The provision of two seals in parallel transverse planes presupposes very great precision in the distances separating these planes both in the container and in the cap, and if such precision is not achieved, the seal is achieved only in one plane. Furthermore, this idea provides no solution to the problem arising when the cap is not fully screwed on or becomes accidentally unscrewed.

The provision of a second seal by means of complementary tapered portions is also a doubtful solution because of the difficulty of producing by moulding two perfect complementary parts which do not jam; furthermore, the same criticisms can be levelled at this solution as at the preceding one as regards the precision in the distance between the sealing means and the possibility of leakage in the event of the cap becoming unscrewed.

It may also be mentioned that incomplete closure of the container by the cap is accompanied by incomplete closure of that portion of the container constituting a chamber in which the hairs of the brush are smoothed or relaxed so that products remaining on the wall of said chamber rapidly dry out and particles thereof are then picked up again the next time the applicator is used, and the brush thus becomes clogged up and these particles, coated with fresh product, are deposited on the eyelashes.

Finally, in most instances, when the brush, smoothed out in a chamber above the drying lip, is pulled out of this chamber, the bristles straighten out with a suddenness depending upon the extent to which they are flattened out in said chamber and this sudden straightening results in particles of the product being flung out and in the danger of soiling the hands or clothing of the user.

The object of the instant invention is to eliminate these drawbacks.

The present invention provides an appli-

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cator for applying paste-like or semi-liquid products which comprises a tubular container sealed at one end and adapted to engage a cap at the other end (hereinafter referred to as the cap end), a cap for closing said container by means of a gentle sliding push-fit, a stem connected to said cap and carrying at its free end a brush for applying the product, said brush being enclosed in said container when the applicator is closed, a sleeve extending axially within said container, attached at the cap end of the container and traversed by said stem, an annular chamber formed between said stem and the interior of said sleeve, the latter being provided at that end nearest the sealed end of the container with an annular lip adapted to remove excess paste-like or semi-liquid product from said brush as said brush is removed from said container, said chamber being situated between two cylindrical sealing zones, each formed by the application of an outer lateral cylindrical surface on one portion of said stem against the inner lateral cylindrical surface of said sleeve, in such manner that the adjacent surfaces remain in sealing contact during the first portion of the transitory movement whereby the brush is removed from the container.

The applicator in accordance with the invention has a plurality of sealing means comprising co-operating rubbing and sliding cylindrical surfaces, the cap being fitted over the container by simply pushing, without any rotation or screwing action.

A first seal is located at the mouth of the container and immediately above the annular lip, and a second seal is disposed above the smoothing chamber.

Also the sleeve constituting this chamber terminates at the cap end in a cylindrical projection coaxial with the remainder of said sleeve and extending into the interior of said cap. The diameter of said cylindrical projection is equal to or a little greater than the diameters of the brush bristles when they are in the relaxed position. Thus, the bristles occupy this relaxed position when they are still surrounded by the cylindrical projection which thereby constitutes a screen defining a relaxing chamber for preventing the cosmetic product from being flung out from the brush.

This cylindrical projection also acts as the second seal by co-operating with a portion of the stem of the brush that is of increased diameter. This portion also acts as a plunger which presses any of the product, that may have become deposited in the relaxing chamber, towards the smoothing chamber and keeps it shut up in this latter chamber.

Since the applicator of the invention does not have a screw-thread (necessitating moulding of the plastics material on the flat, i.e. along a longitudinal joint), the components

of the applicator can be produced by methods operating at faster rates.

This is particularly so with the cap and the brush, which are formed separately and then fitted together, whereas with known applicators, the one-piece moulding of the cap and brush-stem results in very low production rates and numerous rejects.

Other features and advantages will emerge from the following description which refers to the accompanying Drawing.

As can be seen from the single figure of the Drawing, the applicator of the invention comprises a tubular container 1 for the paste-like or semi-liquid products, and a coaxial cap 2, these two parts being fitted one over the other with a gentle rubbing action between two adjacent cylindrical portions A which constitute a final sealing means extending over a considerable length.

At its end furthest from the cap 2, the tubular container 1 is closed by a base element 3 in the form of a plug having a portion 3a bearing against the inner wall of the container 1, said base element being held in position by a collar 3b which clips into a circumferential groove 1a in the wall of the container 1. The outer face of the base element 3 may have a recess 3c to whose floor a label can be affixed. The difference between the diameters a and b enables the base element 3 to be brought into register with the container before it is fitted in its final position.

At its other end the container is so moulded as to provide one of the surfaces A previously mentioned and a roof for maintaining a sleeve having an outer cylindrical projection 5 on the one hand and an inner portion 6 on the other, in concentric relationship with the container.

A brush 8 having a stem 7 is attached to the cap 2, said stem being moulded separately from the cap.

The stem 7 comprises a portion of reduced diameter 7a on which is mounted, in conventional manner, a bristle carrier of the brush 8.

This portion 7a is followed by a median portion 7b of greater diameter, and this median portion is in turn followed by a portion 7c of still greater diameter terminating in a skirt 7d concentric with an axially extending stud 7e, the free end of the skirt 7d extending beyond the end of the stud 7e to an appreciable extent. Throughout this specification, the word "skirt" means a hollow cylindrical projection.

The internal diameter of the sleeve portion 6 is appreciably greater than the external diameter of stem portion 7b but is less than that of the brush 8, so that the annular space thus formed between 6 and 7b forms a smoothing chamber B against whose inner

wall of which the almost flattened out bristles of the brush 8 will rub.

The sleeve portion 6 comprises a conical portion 6a containing a passage whose diameter is substantially equal to the diameter of the stem portion 7b so that its inner wall and the cylindrical outer surface of said stem portion constitute sliding parts which form primary sealing means C at the mouth of the container.

This conical portion 6a terminates in an annular lip 9 which is in frictional contact with the end of the stem portion 7a and which serves the purpose of draining the brush 8 when the latter passes through it, so as to remove excess cosmetic product. The interior of the sleeve 6, i.e. the smoothing chamber B communicates with the interior of the cylindrical projection 5 by way of a tapered portion 4a. The interior of this skirt as the brush is being withdrawn from the container constitutes relaxing chamber D in which the bristles are can progressively relax and assume their normal position, aided by the tapered portion 4a. The wall of the cylindrical projection, as mentioned previously, constitutes a screen for preventing the product from being flicked off the brush.

This wall and the portion 7c constitute co-operating sliding faces forming secondary sealing means. As also previously mentioned, this portion 7c constitutes a plunger for pressing into the space B any of the product that may become deposited inside the cylindrical projection 5.

The stem 7 is attached to the end wall 2a of the cap 2 by means of a smooth skirt 2b which grips the stud 7e and is enclosed in the skirt 7d, the whole forming a self-locking assembly.

Because of the differences between the lengths of the skirts and the stud, reserve chambers F and G are formed.

The stud 7e has an axial bore 7f, closed at one end, communicating with the chamber G which in turn communicates with the atmosphere through vent-hole 2c. The stud 7e has a radial passage 7g whereby the bore 7f communicates with the chamber F, which in turn communicates with the interior of the cap by way of a passage 7h.

Thus, air compressed in the cap when it is fitted over the container is discharged through 7h, F, 7g, 7f G and 2c.

The reserve chambers F and G enable the skirts to be correctly adjusted in relation to each other by preventing an excessively firm grip at the points of contact where the material may undergo shrinkage.

It will be readily appreciated that even if the cap 2 is not fully pushed down over the container 1, there is no risk of leakage, in view of the length of the contacting faces at the mouth of the container (lower seal C) as well as at the mouth of the bristle-relaxing chamber D (upper seal).

Since the chambers B and D cannot communicate with the atmosphere even when the cap is not fully pushed down, no drying out of the product can occur.

The applicator in accordance with the invention thus solves in an advantageous manner a very thorny design problem to which no satisfactory solution has hitherto been found.

#### WHAT I CLAIM IS:—

1. An applicator for applying paste-like or semi-liquid products which comprises a tubular container, sealed at one end and adapted to engage a cap at the other end (hereinafter referred to as the cap end), a cap for closing said container by means of a gentle sliding push-fit, a stem connected to said cap and carrying at its free end a brush for applying the product, said brush being enclosed in said container when the applicator is closed, a sleeve extending axially within said container, attached at the cap end of the container and traversed by said stem, an annular chamber formed between said stem and the interior of said sleeve, the latter being provided at that end nearest the sealed end of the container with an annular lip adapted to remove excess paste-like or semi-liquid product from said brush as said brush is removed from said container, said chamber being situated between two cylindrical sealing zones, each formed by the application of an outer lateral cylindrical surface on one portion of said stem against the inner lateral cylindrical surface of said sleeve, in such manner that the adjacent surfaces remain in sealing contact during the first portion of the translatory movement whereby the brush is removed from the container.

2. An applicator according to Claim 1, wherein said sleeve terminates at the cap end in a cylindrical projection coaxial with the remainder of said sleeve and extending into the interior of said cap, the space within said cylindrical projection constituting a second chamber.

3. An applicator according to Claim 1, wherein the cylindrical surfaces of the stem and sleeve constituting the sealing zone that is closer to the sealed end of the container

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have diameters less than those of the cylindrical surfaces forming the sealing zone at the cap end.

4. An applicator according to Claim 1,  
5 substantially as herein described with reference to the accompanying Drawing.

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COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of  
the Original on a reduced scale

